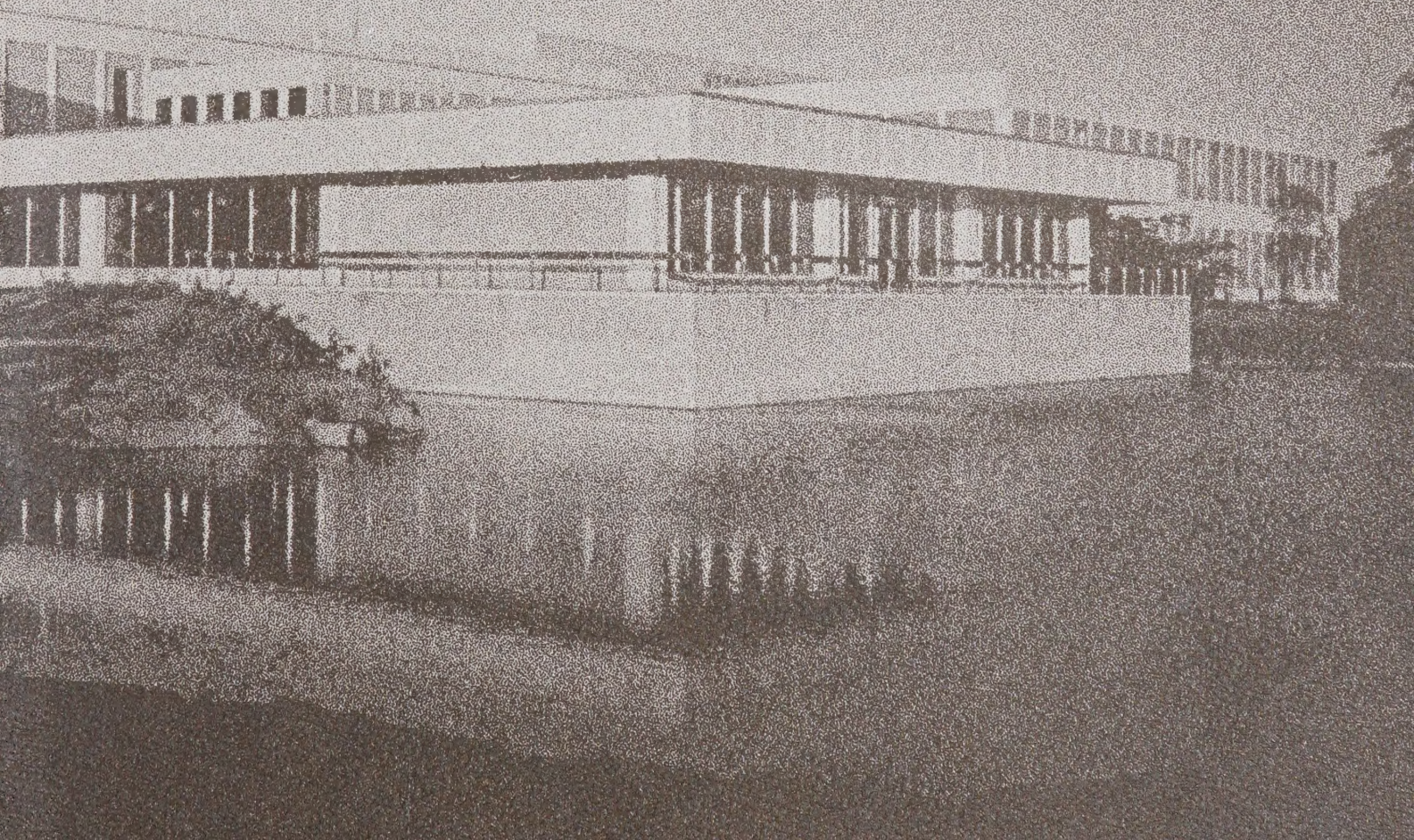


AR11

microsystems international limited

annual report 1972



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Research, development and manufacturing centre in Ottawa.

The Company occupies a \$31 million, 340 thousand square foot research, development and manufacturing facility in Ottawa, designed specifically for the production of semiconductor products. This facility, staffed with more than 350 engineers and other professionals, many with international experience, and over 1000 production and support personnel, is the Company's principal operating base.





highlights of 1972

(dollars in thousands)

	1972	1971	Change
operating results			
• Consolidated net sales	\$12,303	\$ 9,094	35%
• Loss	\$ 4,193	\$ 6,404	—35%

at year end

• Open orders	\$17,600	\$ 5,000	252%
• Total assets	\$32,887	\$31,183	5%
• Number of employees	1,574	1,063	48%
• Patent applications filed	93	78	19%

major company achievements:

- Establishment of an assembly plant in Malaysia
- Installation of a second MOS production line at the Ottawa plant
- Addition to bipolar memories and hybrid subsystems production lines
- Introduction of three new product lines – calculator circuits, light emitting diodes, data systems – and addition of 19 new linear products and 14 new MOS products
- Sales in international markets were 59% of total sales compared to 20% in 1971



to our shareholders

In 1972, the progress of the Company was evidenced by a significant reduction in the fourth quarter loss which amounted to \$397,000 as compared to a loss of \$1,814,000 in the comparable period of 1971; by a large increase in orders received; by a three-fold increase in sales of integrated circuits; and by acceptance of the Company as an established major supplier to the computer and telecommunications industries.

General market conditions for integrated circuits after a slow first quarter showed a continued improvement in each subsequent quarter, notably in North America. In Europe and the Far East, market conditions began to improve by the fourth quarter.

Riding the upsurge in demand from computer, data communications, and industrial equipment manufacturers, the semiconductor industry is expected to achieve, in 1973, an all-time high of over \$3 billion in sales following an unexpectedly strong 1972 which, in turn, had increased over 20% from the previous year.

financial results

Sales in 1972 of \$12,303,000 were up 35% from \$9,094,000 in 1971 and the net loss at \$4,193,000 was down 35% from \$6,404,000. The loss before income tax credit was down 45% from the previous year. Gross profit as a percentage of sales increased from 24% to 33%.

Administrative and general expenses were maintained at the 1971 level. Having established a broad base of manufacturing processes and products through large expenditures in previous years, research and development costs were lowered by \$995,000 during the year. Preproduction expenses at \$3,639,000 were down from \$6,674,000 in 1971. As the basic processes were in volume production by year end, preproduction costs are not expected to be significant in 1973. There was a reduction of \$2,337,000 in Canadian Government grants in 1972 as a result of the decreases referred to above.

Total assets of the Company increased by \$1,704,000.

Expenditures on plant and equipment were \$4,058,000 of which \$953,000 was provided through Canadian Government capital grants and have been deducted from the gross value on the balance sheet of the Company. In line with higher production and sales volumes, inventories increased by \$2,333,000. Accounts receivable were down \$2,870,000 due to lower government grants.

The period for claiming against the Canadian Government grants has been extended from March 31, 1973 to March 31, 1976. Most of the remaining funds available in forthcoming years are applicable to capital equipment acquisitions, thus providing means to expand manufacturing capacity. The remaining commitment to purchase equity by Northern Electric Company, Limited, our bank line of credit, together with the residual Canadian Government assistance, should provide adequate funds for the foreseeable future.

marketing

Substantial penetration of the MOS and bipolar memory markets was made in Canada and the United States. In Europe, the acceptance of semiconductor memories in computer designs was slower than expected. Sales of our bipolar linear products developed strongly by midyear both in Europe and the United States. Long-term supply contracts have been entered into with major customers in the established markets of Canada, United States and Europe, providing a strong and broad base of future demand for the Company's products.

In addition to the above, efforts were directed towards introducing our products to a number of new international market areas, including the Far East, the Middle East and Eastern Europe. In these areas, Japan and Australia are the countries of greatest immediate potential where concentrated effort will be directed during 1973. Attendance at the Canadian Trade Fair, held in Peking in August, created considerable interest in the Company and its products.

The Company entered the market for MOS 4-function calculator circuits to take advantage of the world-wide shortage that developed in the latter part of the year.

An exclusive licensing arrangement permitting the Company to manufacture and sell such a circuit in Canada and Europe was concluded during the year.

Sales of products to Northern Electric amounted to \$4,186,000, compared to \$7,007,000 in 1971. This decrease resulted from the discontinuance of the resale of purchased discrete products and a reduction in the sale of manufactured discrete products to that company.

The necessity for continued extensive market development resulted in higher than normal marketing costs again in 1972. This effort, however, produced open orders at year end of \$17,600,000 compared to \$5,000,000 at the end of 1971. The sales increases anticipated during 1973 should further improve the ratio of marketing costs to sales.

manufacturing

Early in 1972, the Company decided to establish an assembly facility in Penang, Malaysia. Production started in record time by midyear and by year end, the plant was delivering large volumes of finished devices. The new facility permits the Company to manufacture at competitive cost, to strengthen its position in world markets and the consequent enlargement of its basic manufacturing facilities in Canada.

The bipolar memory line, which was in operation by the end of 1971, reached commercial production levels during the year and volumes have grown rapidly in response to market demands.

The wide acceptance of both the Company's established and new MOS memory products taxed to the limit the initial facilities in Ottawa. A major expansion program was undertaken in June to double capacity by installing a second processing line. The new line using larger wafers was installed by the end of the year. With this increased capacity, the Company now has one of the largest production facilities for MOS silicon gate circuits in the world.

Significant processing improvements were made in the bipolar linear line during the second half of the year.

A number of new products were introduced to broaden the product base. The Company has the capability in this line to manufacture large volumes of products at low cost.

The unique products from the Company's hybrid line are gaining acceptance in the telecommunications field, particularly in Canada and Europe. The process itself and the equipment used in the process involve highly complex and advanced technology. For instance, the process utilizes a modern computer-controlled laser trimming system which has not previously been used in industry for the manufacture of high volume, high quality circuits. Start-up problems were encountered, but towards the end of the year, these difficulties had been overcome and the line was operating on a multi-shift basis.

Support services, such as quality and reliability control, ultra-pure water supply and product testing were expanded to meet the growing volume of production and to maintain the recognized high standard of the Company's products.

technical progress

The Company's development effort was directed primarily towards improving and enlarging the product portfolios for MOS and bipolar memories, linear integrated circuits and telecommunications hybrid subsystems. Following the successful transfer into production of the Company-developed N-channel MOS process, several "state-of-the-art" circuits were designed to exploit this process. Most outstanding of these is an MOS 4,096-bit dynamic memory which was shipped in sample quantities by year end — an industry first. This achievement established the Company's technical leadership in the design and manufacture of advanced memory products and elicited strong interest from potential customers.

After having obtained the transfer of the bipolar memory process and some products from Monolithic Memories, Inc., as provided for in the agreement signed with that company in September 1971, the Company and MMI terminated the agreement on mutually

acceptable terms, effective February 2, 1973. During the term of the agreement, the Company became self-sufficient in this technology and by year end had transferred the first of its own product designs to production and had several new bipolar memory designs in development.

During the year, a number of new hybrid telecommunications products were developed. Among these are a tone receiver, a monolithic tone ringer, a network protector device using a proprietary surge protection diode, a digital-to-analog converter, the complete circuitry for an electronic telephone, and a family of "micro-tubes" which are solid state replacements for some types of vacuum tubes.

The Company also decided to broaden its product base by entering the data systems business. This represents a forward integration from an established components base. The knowledge obtained in the application of complex components to systems has enabled the Company to develop several unique systems of its own and to offer high value-added products to its customers. Products, such as semiconductor memory boards, subsystem assemblies for micro-processors, modems and data terminals are forerunners of this new product line. Initial orders for memory boards have been received and it is expected that, as the product line is expanded, this new business will contribute significantly to Company growth and profitability in future years.

During the year, 47 invention disclosures were made and 93 patent applications were filed in 14 different countries, indicating the continued high rate of innovation resulting from expenditures on research and development. Since the formation of the Company, a total of 134 disclosures have been made, 21 patents have been issued and 149 patent applications are pending.

organization and personnel

Two wholly-owned foreign subsidiaries were incorporated as a result of the increasing involvement of the

Company in international business activities. Microsystems International Inc., a Delaware corporation, will be used initially as the marketing arm in the United States. A Malaysian company, Microsystems International Sendirian Berhad, was formed at the time of the establishment of the assembly facilities in Penang, Malaysia.

By year end, the number of employees had reached 1,574, an increase of 48% over the previous year.

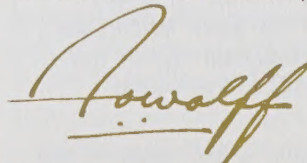
During the current period of rapid growth of the Company, much stress is being placed on management, and indeed all employees, and their continued dedication and support in the coming year is necessary to achieve the Company's objectives.

looking ahead in 1973

The opportunities facing the Company are represented by the large amount of orders on hand, a rising rate of order intake, buoyant markets, and the ready acceptance by customers of a large number of new products, all of which is the result of demonstrated technical and manufacturing competence.

In order to grasp these opportunities, the Company must maintain an internationally competitive position particularly through price and quality, expand its manufacturing capabilities both in Canada and in foreign markets, hire and train a large number of new employees and develop additional supervisory and management talent. In brief, the challenge facing the Company is to manage and to control its rapid growth. When this challenge is met, the Company will show vastly improved sales, lower costs and profitability.

On behalf of the Board,



A. O. Wolff, President

March 19, 1973.

consolidated statement of earnings and deficit for the year ended december 31, 1972

(with comparative figures for the year ended December 31, 1971)

	1972	1971
	(Thousands of Dollars)	
Sales (Note 2)	12,303	9,094
Cost of sales	8,221	6,949
Gross profit on sales	4,082	2,145
Expenses:		
Administrative and general	1,425	1,639
Marketing	2,215	2,055
Royalties	112	59
	3,752	3,753
Operating profit (loss) before research and development and preproduction expenses	330	(1,608)
Research and development expenses	5,138	6,133
Preproduction expenses	3,639	6,674
	8,777	12,807
Less: Canadian Government grants (Note 10)	4,639	6,976
	4,138	5,831
Operating loss	3,808	7,439
Interest expense – net	385	198
Loss before income tax credit	4,193	7,637
Income tax credit (Note 11)	—	(1,233)
Net loss for the year	4,193	6,404
Deficit – Beginning of year	18,374	11,970
Deficit – End of year	22,567	18,374
Net loss per share	\$ 0.83	\$ 1.27

consolidated balance sheet as at december 31, 1972

(with comparative figures as at December 31, 1971)

assets	1972	1971
	(Thousands of Dollars)	
Current assets		
Cash	145	237
Accounts receivable (Note 5)	6,550	9,420
Inventories (Note 6)	5,855	3,522
Prepaid expense	768	104
	13,318	13,283
Investment		
Investment in Monolithic Memories, Inc. (Note 7)	1,000	600
Fixed assets (Notes 8 and 10)		
Plant and equipment	31,658	28,412
Less: Canadian Government grants	5,430	4,477
	26,228	23,935
Less: Accumulated depreciation	7,659	6,635
	18,569	17,300
Total assets	32,887	31,183

On behalf of the Board:

B. W. King, Director

A. O. Wolff, Director

liabilities

	1972	1971
	(Thousands of Dollars)	
Current liabilities		
Bank indebtedness	4,302	4,350
Accounts payable and accrued liabilities (Note 5)	3,885	3,897
Current portion of loan payable (Note 10)	1,002	—
	9,189	8,247
Loan payable (Note 10)	4,010	4,055
Advance from parent company (Note 9)	10,000	5,000
	23,199	17,302

shareholders' equity

Capital stock (Note 9)		
Authorized – 8,000,000 common shares without nominal or par value		
Issued – 5,050,009 shares	30,275	30,275
Contributed surplus (Note 8)	1,980	1,980
Deficit	(22,567)	(18,374)
	9,688	13,881
Total liabilities and shareholders' equity	32,887	31,183

auditors' report

The Shareholders,
Microsystems International Limited

We have examined the consolidated balance sheet of Microsystems International Limited and its subsidiary companies as at December 31, 1972 and the consolidated statements of earnings and deficit and source and application of funds for the year then ended. Our examination included a general review of the accounting procedures and such tests of accounting records and other supporting evidence as we considered necessary in the circumstances.

In our opinion these consolidated financial statements present fairly the financial position of the companies as at December 31, 1972

and the results of their operations and the source and application of their funds for the year then ended, in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Touche Ross & Co.
Chartered Accountants.

Ottawa, Ontario.
January 25, 1973.

consolidated statement of source and application of funds for the year ended december 31, 1972

(with comparative figures for the year ended December 31, 1971)

	1972	1971
	(Thousands of Dollars)	
Source of funds		
Canadian Government loan (Note 10)	957	2,192
Advance from parent company	5,000	5,000
Decrease in working capital	907	2,366
	6,864	9,558
Application of funds		
Operations		
Net loss for the year	4,193	6,404
Add: Income tax credit (Note 11)	—	1,233
	4,193	7,637
Less: Charge not requiring an outlay of funds		
Depreciation (Note 3)	1,836	2,041
	2,357	5,596
Reduction of loan payable (Note 10)	1,002	—
Investment in Monolithic Memories, Inc. (Note 7)	400	600
Fixed asset additions	4,058	5,829
Less: Canadian Government grants	953	2,467
	3,105	3,362
	6,864	9,558

notes to the consolidated financial statements

december 31, 1972

1. principles of consolidation

The consolidated financial statements include the accounts of all the subsidiary companies.

2. sales

Sales include \$4,185,745 (\$7,007,277 in 1971) to Northern Electric Company, Limited ("Northern Electric"), the parent company.

3. depreciation

Depreciation is calculated on the straight line method, using rates based on the expected useful lives of the assets.

In 1972, the Company, after three years' experience in the utilization of its equipment, carried out a comprehensive study of the estimated useful lives of such equipment. As a result of this study, the estimated useful life of most of the processing equipment has been extended to seven years from four years. In addition, certain assets have been written off. This resulted in a reduction in depreciation of \$522,395 in 1972 and a further \$43,346 in respect to prior years.

4. remuneration of directors and officers

The number of directors of the Company during 1972 was nine (ten in 1971) and the aggregate remuneration paid to the directors of the Company as directors during 1972 was \$12,100 (\$12,383 in 1971). The number of officers of the Company during 1972 was nine (six in 1971) and the aggregate remuneration paid to the officers of the Company as officers during 1972 was \$193,750 (\$171,904 in 1971). Two (three in 1971) of the officers are directors.

5. accounts receivable and accounts payable

Accounts receivable include \$3,044,248 (\$7,473,083 in 1971) from the Canadian Government ("Government") for grants and loan and \$792,361 (\$663,775 in 1971) from Northern Electric. Accounts payable include \$60,626 (\$237,097 in 1971) due to Northern Electric.

6. inventories

Inventories are valued at the lower of cost and net realizable value.

7. investment in monolithic memories, inc.

In 1971, the Company concluded an agreement with Monolithic Memories, Inc. ("MMI"), a United States company, to acquire technology, which agreement included the purchase of 40,000 common shares of MMI, at a price of \$15 per share. In addition, the Company has an option to purchase up to 25,000 common shares of MMI at a maximum price of \$25 per share, which option is exercisable until September 20, 1973.

Further, the Company agreed to purchase during the period ending September 20, 1973, contingent upon the satisfactory transfer of technology from MMI to the Company, 40,000 common shares of MMI at a price of \$20 per share, if called upon by MMI to purchase such shares. On October 16, 1972, the Company was called upon to purchase 20,000 common shares, increasing its investment in MMI to 60,000 common shares (a 9.68% interest). As a result of a further call, the Company purchased the final 20,000 common shares on January 2, 1973, increasing its investment to 80,000 common shares (a 12.51% interest).

The equity of MMI available to its common shareholders, according to its audited financial statements as at September 30, 1972, was \$558,918.

8. fixed assets

Fixed assets which were acquired from Northern Electric are recorded at the values at which they were carried in the books of Northern Electric, resulting in a net increase in the carrying value of the Company's fixed assets of \$1,979,676 which is reflected as a contributed surplus. Other fixed assets are valued at cost, less Government conditional grants of \$5,347,672 and grants of \$82,416 under the Industrial Research and Development Incentives Act.

9. capital stock

Northern Electric has subscribed and agreed to pay for, over a period ending December 31, 1973, an additional 1,500,000 common shares of the Company at a price of \$10 per share. As at December 31, 1972, Northern Electric had advanced \$10,000,000 in respect of a future issuance of common shares.

The Company has reserved 430,000 common shares for issue upon exercise of 430,000 outstanding share purchase warrants. Each share purchase warrant entitles the holder to purchase one common share of the Company at a price of \$13.50 per share until April 1, 1979.

250,000 common shares are reserved for issue upon exercise of stock options granted or to be granted to salaried officers and other key employees. Options are exercisable in instalments in the three years following the second anniversary of the date of the grant and must be exercised no later than seven years from the date of the grant. Options outstanding at December 31, 1972 were as follows:

Date of Grant	Option Price per Share	Outstanding December 31, 1972
June 23, 1971	\$4.97	81,500
May 30, 1972	\$6.76	55,750

Shares under option at December 31, 1972 included

59,000 shares under option to officers of the Company, one of whom is also a director.

10. canadian government grants and loan

The Government has undertaken to reimburse the Company for expenditures incurred and approved prior to April 1, 1976, (1) by means of a conditional grant not exceeding \$12,000,000 and an interest-free loan not exceeding \$12,000,000, for 100% of the cost of the purchase or manufacture by the Company of specified equipment, to which the Government will originally hold title, (2) by means of a conditional grant not exceeding \$14,200,000 (as recently amended) for 50% of the cost incurred by the Company for research and development expenses and (3) by means of a conditional grant not exceeding \$9,750,000 (as recently amended) for 50% of the cost incurred by the Company for preproduction expenses.

The conditional grant of \$5,347,672 from the Government for the provision of specified equipment has been deducted from the cost of related equipment (Note 8). Should the cumulative earnings of the Company (after deduction of losses) before income taxes be in excess of 10% of the cumulative sales of all products except discrete components, this grant will be repayable, without interest, from cumulative earnings in excess of 10% of such sales. The interest-free loan is repayable in five equal consecutive annual instalments in respect of each equipment package. The first instalment on the first equipment package is payable December 31, 1973.

Conditional grants from the Government in the year ended December 31, 1972 of \$2,624,657 for research and development expenses and \$2,396,862 for preproduction expenses have been deducted from the related expenses and are repayable on the same basis as the conditional grant for specified equipment.

To December 31, 1972, the Company has claimed \$25,183,859 in respect of conditional grants.

11. income taxes

Possible future reductions in income taxes relating to losses incurred in the years 1969 to 1972 inclusive, have not been taken up in the accounts, as the date of their realization and the amount which may be realized cannot, as yet, be determined.

Deferred income taxes of \$2,274,000 recorded on the acquisition of fixed assets from Northern Electric were eliminated by December 31, 1971 by income tax credits recorded as a result of depreciation being provided in the Company's accounts but not being claimed for income tax purposes.

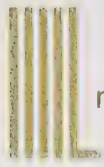
12. commitments

As at December 31, 1972, there were outstanding commitments of \$1,734,200 for additions to plant and equipment.

Material contractual obligations in respect of long-term leases of the Company amounted to \$1,562,975 at December 31, 1972. Related rentals incurred for the year then ended amounted to \$330,517 and the minimum amount applicable to the five years subsequent to December 31, 1972 is \$1,124,162 of which \$318,601 is applicable to the year ended December 31, 1973.

13. plan for employees' pensions

The latest actuarial valuation of the Plan for Employees' Pensions established an unfunded liability of \$264,500 at December 31, 1969. This amount is being funded by regular payments which will terminate in 1988. Payments are charged to operations in the year they are made.



our products

Microelectronic products manufactured by the Company have applications in a broad range of electronic equipment for consumer, industrial and military use. This section of the Annual Report is intended to highlight the basic product groups and only a few of the many markets which are served by the Company. Products range from single diodes and transistors to highly sophisticated hybrid subsystems and advanced MOS silicon gate memory systems.

memory components

Memory components are manufactured by the Company using either metal oxide silicon (MOS) or bipolar processes. MOS silicon gate is the high packing density process giving maximum functional complexity on the silicon chip and therefore lowest cost per function. The bipolar memory process provides higher performance, that is, faster switching speed, with a high degree of complexity but at a higher cost per function.

The principal memory components manufactured by the Company are:

- Random access memories (RAMs) which allow digital information to be written into or read out from any selected bit in the memory. RAMs are used in computer main memories and currently are replacing ferrite core memories because of performance, size and cost advantages. The major Company product in the RAM category is the MF 1103 which has 1,024 memory cells on a silicon chip 1/8 inch x 5/32 inch in size. The MF 1103 has become an industry standard and the Company presently has a major share of the market for this product.
- Read only memories (ROMs) which have fixed memory contents determined at manufacture for individual application. These are used in computer systems to contain fixed data such as part of the computer program or an arithmetic look up table.
- Programmable read only memories (pROMs) which are ROMs whose memory content can be electrically

programmed. These are used in equipment development programs where memory contents may change frequently or where there are a great number of memory patterns required. An example of a product in the pROM category is the MD 6300. This bipolar memory circuit contains 1,024 memory cells and programming is accomplished by burning out microscopic nichrome fuses present in each cell. The MD 6300 is also an industry standard part and the Company has achieved a major supplier position in this line of products.

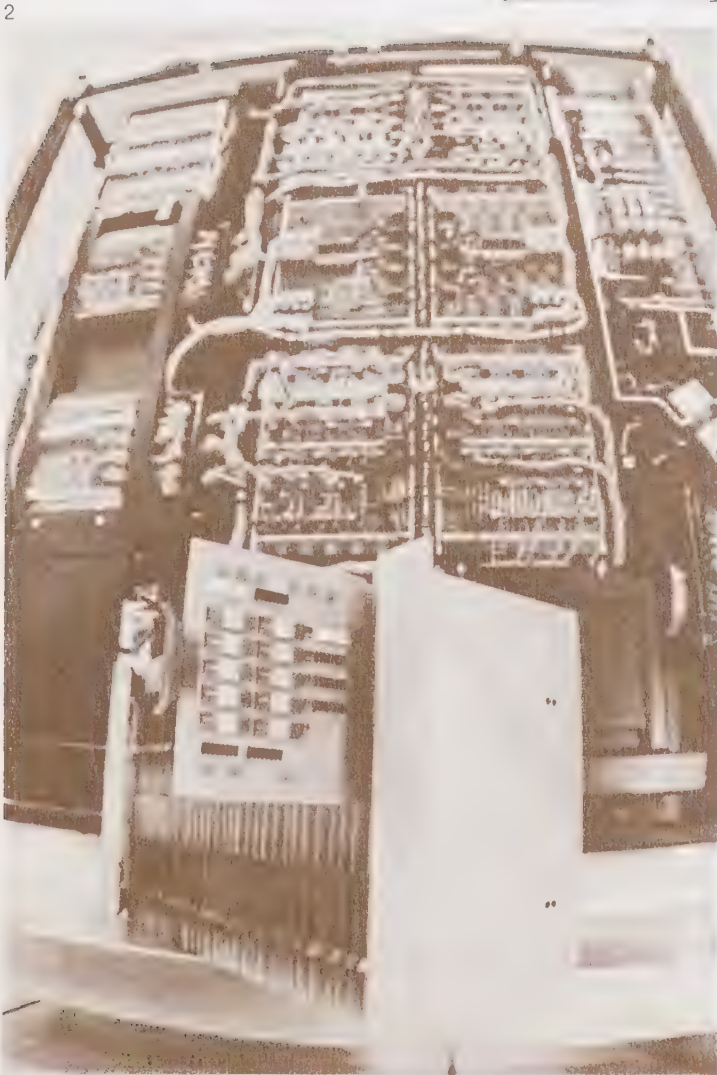
- Shift registers, made generally by the MOS process. These are serial memories having one input and one output, and in operation are analogous to a delay line. One of the applications for shift registers is as a memory for video terminals which require the stored information in a serial, sequential manner.

data systems

The specialized technical knowledge obtained from the design and manufacture of advanced memory components for the computer and telecommunications markets has enabled the Company to broaden its product base to include data systems. These systems are a combination of a number of complex components forming a complete system function — often in a new and unique fashion.

Data systems in development and pilot production include several types of semiconductor memory systems, capable of storing up to 100,000 bits of information, and a variety of telecommunications products which provide new electronic functions for telephone apparatus and switching office use. Many of these systems are the electronic equivalent of existing electro-mechanical systems.

The computer and telecommunications industries are undergoing a major equipment evolution as transmission of large volumes of data over long distances demands the re-design and updating of traditional communications networks. The Company's new technologies and systems can contribute significantly in the realization of this program.



1 — RAM 1A memory board consisting of 96 MF 1103 MOS random access memories and associated circuits. Developed around the Company's MF 1103 silicon gate MOS RAM the memory board can be used for main and buffer memory applications in computers, data terminals and electronic switching systems.

2 — The Company's new 4,096-bit MOS RAM is the heart of a fast compact computer memory system. The RAM 4A 256 kilo-byte random access memory system is shown here photographed in front of a 125 kilo-byte ferrite core memory. The RAM 4A memory system offers a dramatic reduction in power and size requirements per bit of storage compared to existing memory systems.

linear integrated circuits

The first integrated circuits produced were designed to perform binary logic which means the circuit was either "full-off" or "full-on", depending on how it was used. These integrated circuits manufactured in large volumes made possible the computer industry as we know it today.

As processing technology improved, it became possible to make a device which was not simply "on" or "off" but which produced an output proportional to the magnitude of the input. This type of device is a linear integrated circuit, as for example, an amplifier.

The general purpose operational amplifier is still the basis of the Company's linear business, but technology advances have made possible improvements such as a device for sensing extremely small signals in precision measurement; a micropower device for operation at low voltages and power levels for battery-powered applications; a high voltage device and multiple operational amplifiers which combine more than one of these functions in a single package.

Other selected products fill out the present linear integrated circuit line. Voltage regulators provide a stable supply from which other integrated circuits can be powered, and line drivers and receivers are used in the data transmission devices which interface with computers.

hybrid products

Hybrid products are those which utilize film technology together with silicon devices. The Company has manufacturing lines using both thin and thick films processes. The products derived from both of these processes each have their areas of specialization and both types are particularly applicable to the requirements of communications equipment as well as being completely compatible with the Company's silicon integrated circuit capabilities.

Thin films consist of microscopic layers of tantalum

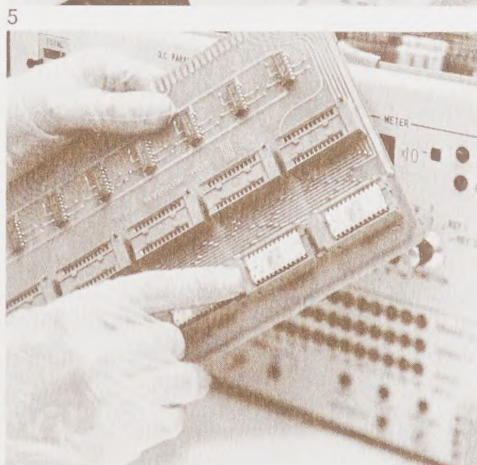
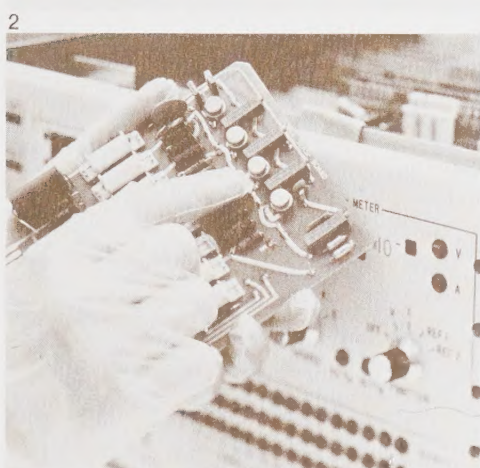
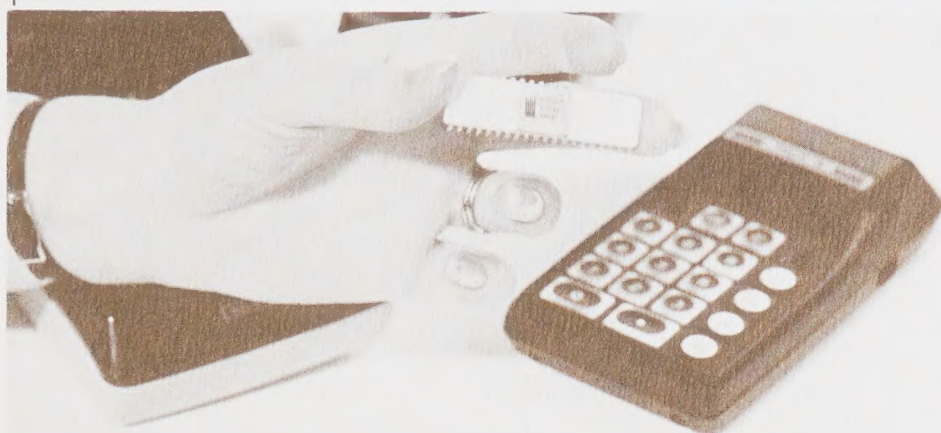
deposited on special ceramic substrates. Using this process, closely controlled components such as resistors and capacitors can be made. The precision of these components is finally established by using a laser trimming machine. The total technology is complex and only a few manufacturers have the process in large volume production. Examples of the use of this technology are found in the Company's tone generator for telephone use and in tone receivers; this latter product can be used in telephone switching offices to detect telephone dialing tones.

Thick films are conductive inks, screened, printed and fired onto ceramic substrates to form resistors and interconnections. This process is thus similar in concept to thin film but does not possess the component accuracy or stability possible with thin films. On the other hand, it is a less costly process. An example of its use by the Company is in the miniature amplifier for a new lightweight headset worn by telephone switchboard operators.

calculator circuits

The small hand-held electronic calculator is rapidly becoming a universal accessory to everyday life. Easier to use and more versatile than the existing conventional calculators, it has quickly become a popular consumer item.

This type of electronic calculator is made possible by the availability of large and complex MOS circuits manufactured at low cost in high volume. These circuits take the input from the keyboard, perform the arithmetic calculation required and drive the output display to show the correct answer.



products

• Computer Components

- Random access memories
- Read only memories
- Programmable read only memories
- Shift registers
- Special purpose circuits
- Peripheral circuits
- Custom circuits

• Linear Integrated Circuits

- General purpose operational amplifiers
- Precision operational amplifiers
- Micropower operational amplifiers
- High voltage operational amplifiers
- Multiple operational amplifiers
- Voltage regulators
- Line drivers and receivers
- Transistor arrays
- Reference diodes
- Comparators
- Custom circuits

• Telecommunication Circuits

- Tone generators
- Tone receivers
- Tone ringers
- Microphone amplifiers
- Digital to analog converters
- Network protector devices
- Micro-tubes
- Crosspoint switches
- Custom circuits

• Data Systems

- Memory systems
- Microcomputer systems
- Custom circuits

• Discrete Components

- Diodes
- Transistors
- Light emitting diodes
- Custom components

- 1 — MOS silicon gate calculator circuits have made possible the low cost hand-held calculator.
- 2 — A technician points to one of the Company's bipolar linear integrated circuits which are used in a wide variety of electronic test equipment, industrial control circuits and medical electronic apparatus.
- 3 — A unique design, the ME 8802 thin film microcircuit consisting of eight separate active filters has many applications in telecommunications equipment including data terminals and modems.
- 4 — High performance tone receivers manufactured by the Company use both silicon integrated circuits and hybrid microcircuits and have wide application in telecommunications systems.
- 5 — Electrically programmed by either the customer or the supplier, the Company's MF 1601 ROM provides 2,048 bits of memory for experimenting with various coding patterns in computer memories.



board of directors

DONALD A. CHISHOLM,
President, Bell-Northern Research Ltd.

PIERRE R. GENDRON,
President, Pulp & Paper Research Institute of Canada

B. WENSLEY KING,
Chairman, Mowatt & Moore Limited

JOHN C. LOBB,
President, Northern Electric Company, Limited

CLIFFORD S. MALONE,
President, Canron Limited

VERNON O. MARQUEZ,
Chairman of the Company and Chairman and
Chief Executive Officer, Northern Electric Company, Limited

MAURICE PRICE,
Consultant

ROBERT C. SCRIVENER,
Chairman and Chief Executive Officer, Bell Canada

A. OLAF WOLFF,
President and Chief Executive Officer of the Company

senior management

officers

VERNON O. MARQUEZ, Chairman

A. OLAF WOLFF, President and Chief Executive Officer

HOWARD R. ARMSTRONG, Vice-President and Treasurer

JOHN M. BEDDOES, Vice-President, Technical Development

JOSEPH L. CHENAIL, Vice-President, Marketing and Sales

JOHN F. SCHUCK, Vice-President, Operations

MARC RÉGNIER, Secretary and Legal Counsel

RALPH R. MOORE, Comptroller

T. RICHARD HORNBY, Assistant Treasurer

other senior managers

JOHN C. BAIN, Director, Computer Sciences

R. KENNETH EADIE, Director, Manufacturing (Components)

R. JOHN S. HOPE, Director, Quality and Reliability

PETER G. TURNER, Executive Assistant to the President

head office

800 Dorchester Boulevard West, Montreal, Canada

research, development and manufacturing centre

75 Moodie Drive, Ottawa, Canada

assembly plant

Bayan Lepas

Penang, West Malaysia

subsidiaries

Germany: Microsystems International GmbH

Malaysia: Microsystems International Sendirian Berhad

United States: Microsystems International Inc.

marketing offices

CANADA

Montreal, Quebec: 800 Dorchester Boulevard West

Ottawa, Ontario: 75 Moodie Drive

UNITED STATES

Palo Alto, California: 450 San Antonio Road

Huntingdon Valley, Pennsylvania: 1 Fairway Plaza

EUROPE

United Kingdom and Scandinavia:

London W.2, England: 164/166 Edgware Road

Germany:

7 Stuttgart 1 (W), West Germany: Gustav-Siegle-Strasse, 96

distributors and representatives

in 18 foreign countries including Australia, Belgium, France, Holland, Italy and Japan

transfer agent and registrar

Montreal Trust Company:

Halifax, Montreal, Toronto, Winnipeg, Regina, Calgary and Vancouver

stock listings

Montreal, Toronto and Vancouver Stock Exchanges

auditors

Touche Ross & Co., Montreal

number of shareholders on december 31, 1972

32,438

annual meeting of shareholders

April 24, 1973 in Montreal

